

CLAIMS

1. A compressed fluid operated fastener driving tool, which can be selectively triggered for driving fasteners into an underlying workpiece, said tool comprising a frame, a fastener feeder for feeding fasteners to a fastener discharge mechanism of said driving tool, said fastener driving
5 mechanism capable of shifting between a rest and an operative condition, said fastener discharge mechanism comprising:
 - a housing, comprising:
 - a first chamber having a fluid inlet destined to be connected to a source of compressed fluid for keeping said first chamber pressurized,
 - 10 – a second chamber, comprising first and second fluid inlet ports for admitting compressed fluid from said first chamber into said second chamber, said second fluid inlet port capable of being selectively opened and closed, said second chamber being selectively depressurizable, said second chamber being pressurized when said fastener discharge mechanism is in said rest condition;
 - 15 – a third chamber, comprising a piston slidably mounted therein, said piston comprising a piston head and a plunger downwardly depending from said piston head, wherein said piston is biased from a first limit position towards a second limit position when said third chamber is in fluid communication with said first chamber, said piston being in said first limit position when said fastener discharge mechanism
20 is in said rest condition;
 - a valve controlling fluid communication between said first chamber and said third chamber, said valve being biased towards an open limit position when said second chamber is depressurized

where fluid communication is established between said first and said third chamber, and said valve being biased towards a closed limit position when said second chamber is pressurized where fluid communication is interrupted between said first and said third chamber;

wherein after said tool is triggered, said fastener discharge mechanism passes from said rest
5 condition to said operative condition, said second chamber is depressurized to induce movement in said valve towards said open position,

wherein when said valve is moved towards said open limit position, said second chamber second fluid inlet port is closed, and fluid communication is established between said first chamber and said third chamber, thus urging said piston towards said second limit position for allowing a fastener to
10 be struck by said plunger and thus discharged from said tool;

and wherein after said piston is moved towards said second limit position, fluid flowing into said second chamber through said first fluid inlet port pressurizes same and initiates movement of said valve towards said closed limit position, and wherein after initiation of movement of said valve towards said closed limit position, said second fluid inlet port is opened to accelerate pressurizing of
15 said second chamber and thus accelerate movement of said valve towards said closed limit position.

2. A compressed fluid operated fastener driving tool according to claim 1,

wherein said second fluid inlet port is closed by being obstructed by said valve when latter is in said open limit position, and wherein said second fluid inlet port is opened when it is cleared by said
20 valve after initiation of the movement of said valve from said opened limit position towards said closed limit position.

3. A compressed fluid operated fastener driving tool according to claim 1,

wherein said fastener discharge mechanism comprises an impact receiving member, and said impact receiving member has to be struck to pass said fastener discharge mechanism from said rest condition to said operative condition.

5 4. A compressed fluid operated fastener driving tool according to claim 3,
wherein said impact receiving member comprises a hollow head member, comprising said second chamber therein.

5. A compressed fluid operated fastener driving tool according to claim 4,
10 wherein said head member comprises at least one air outlet channel made therein, opening into said second chamber at a first end, and into an atmospheric pressure fluid volume at a second end, and wherein said second chamber can be selectively depressurized upon selective establishment of fluid communication between said second chamber and said air outlet channel second end.

15 6. A compressed fluid operated fastener driving tool according to claim 5,
wherein a peripheral wall of said valve snugly and slidably engages a peripheral wall of said second chamber, said valve is slidable about said second chamber, wherein said valve is slid away from said second chamber when said valve is in said closed limit position, wherein said valve is slid towards said second chamber when said valve is in said open limit position.

20 7. A compressed fluid operated fastener driving tool according to claim 6,
wherein said second chamber first fluid inlet port is formed by at least one first inlet channel made in said valve, opening at a first end into said main chamber, and opening at another end into said second chamber, and said second chamber second fluid inlet port is formed by at least one second

inlet channel made in said head member, opening at a first end into said main chamber, and opening at a second end into said second chamber, and wherein said valve peripheral wall obstructs said second inlet channel second end when said valve is in said open limit position, and wherein said second fluid inlet port is opened when said valve is not in said closed limit position.

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8. A compressed fluid operated fastener driving tool according to claim 1, further comprising means for biasing said piston towards said first limit position when said valve is in said closed position.

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9. A compressed fluid operated fastener driving tool according to claim 1, wherein said third chamber is a cylinder.

10. A compressed fluid operated fastener driving tool according to claim 3, wherein a shock absorbing cap is fitted on said head member.

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11. A method for discharging a fastener out of a pneumatic fastener driving tool comprising a fastener feeder for feeding fasteners to a fastener discharge mechanism, which can be triggered to pass from a rest condition to an operative condition, and which comprises a housing having a pressurized first chamber, a selectively depressurizable second chamber comprising a first fluid inlet port and a selectively closable second fluid inlet port, said second fluid inlet port being open and said second chamber being pressurized when said tool is in said rest condition, and a third chamber in which a piston having a plunger is slidably mounted, said piston being movable between retracted and deployed limit positions and being biased towards said deployed limit position when fluid communication between said first and said third chambers is established, a

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valve being further nested within said housing and permitting selective establishment of fluid communication between said first and said third chamber, said method comprising the steps of:

- (h) triggering said fastener discharge mechanism to pass it in said operative condition;
- (i) depressurizing said second chamber and closing said second fluid inlet port thereof;
- 5 (j) since said second chamber is depressurized, displacing said valve towards said open position to establish fluid communication between said first and said third chambers;
- (k) displacing said piston towards said deployed limit position;
- (l) striking a fastener with said plunger to discharge a fastener from said tool;
- (m) admitting compressed fluid into said second chamber from said first chamber through said
10 first fluid inlet port to pressurize said second chamber and thus initiate movement of said valve towards said closed position; and
- (n) once movement of said valve is initiated, opening said second fluid inlet port to further admit compressed fluid into said second chamber, to further pressurize the latter and accelerate displacement of said valve towards said closed position.

15 12. A method according to claim 11,

further comprising the step, after step (g), of biasing said piston towards said retracted limit position.

13. A pneumatic nailer for use with floor securing cleats in working in hard to reach floor areas, said

20 nailer comprising a main frame, a first air chamber, a second air chamber, a piston member reciprocatingly movable through said second air chamber, said piston member defining a plunger having at a bottom end a striker head for striking and ejecting selected floor securing cleats in successive reciprocating cycles with the cleats located outwardly of said second air chamber, and at a top end a piston head, wherein said second air chamber forms an upper

subchamber and a lower subchamber on opposite sides of said piston head in substantially airtight fashion relative to one another wherein said upper subchamber and said lower subchamber are of complementarily inversely variable volume, said upper subchamber in fluid communication with said first air chamber, a third air chamber in fluid communication with said lower subchamber, first valve means controlling air flow from said first air chamber to said upper subchamber, said first air chamber adapted to contain continuous over atmospheric air pressure level thereinto, unidirectional second valve means controlling air flow from said lower subchamber to said third air chamber, first channel means for through air flow between said lower subchamber and said third air chamber responsively to an air pressure differential therebetween, and trigger means for releasably moving said first valve means from a closed condition to an opened condition enabling air flow from said first air chamber to said upper subchamber; wherein said first valve means includes means to adjust the duration of each of said reciprocating cycles of said piston member.

14. A pneumatic nailer as in claim 13,

further including a guide member, mounted to said main frame and opening into said lower subchamber of said second air chamber, said guide member including a central slit slidably engaged by said plunger for guiding motion of said plunger during said reciprocating cycles thereof.

15. A pneumatic nailer as in claim 14,

wherein said second air chamber defines a peripheral wall section having an inner wall, slidably engaged by said piston head, and an outer wall, a first series of registering access bores made into said wall section and opening into said third air chamber, and said second valve means consists of

an elastic band applied against said second air chamber outer wall in releasable sealing register with said access bores of said wall section of said second air chamber.

16. A pneumatic nailer as in claim 15,

5 wherein the material nature of said guide ring member and the size of said guide ring member central slit relative to the section of said plunger slidably engaging through said slit, are such that any overpressure inside said lower subchamber will be allowed to outwardly leak at a controlled rate through said slit toward ambient air.

10 17. A pneumatic nailer as in claim 16,

wherein said trigger means includes an anvil member having an outer exposed section and an inner section, said anvil member movably mounted to said main frame between an extended position and a retracted position, a fourth air chamber in fluid communication with said first air chamber through a fluid passageway, and third valve means opening said fluid passageway at said extended position
15 of said anvil member and closing said fluid passageway at said retracted position of said anvil member, and air outlet means providing air outflow from said fourth air chamber after said anvil member leaves said extended position thereof;

wherein said air outflow from said air outlet means provides the biasing means that biases said first valve means to move from its said closed condition to its said opened condition.

20 18. A pneumatic nailer as in claim 14,

wherein said trigger means and said first valve means are mounted in a screwtube releasably screwable into a threaded access bore in said main frame.

19. A pneumatic nailer as in claim 17,

further including a combined screw mount assembly for releasably screwing said trigger means and said first valve means to said main frame, for facilitating manual access to said second air chamber and to said piston head for maintenance purposes.

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20. A pneumatic nailer as in claim 19,

further including a damper cover, mounted to said exposed section of said anvil member, said damper cover made from a shock absorbing material.